Drills

Chapter 1

1) Identify the number of significant figures in each of the following numbers

a 1837 **b** 302400 **c** 19.7324 **d** 8.7300 **e** 1900.00

f 3.14×10^4 **g** 632 **h** 3024000.0 **i** 1900 **j** 0.00743

k 6005 **l** 8.732 **m** 149356 **n** 200000 **o** 6000

p 0.08206 **q** 14.163000 **r** 205.8 **s** 426.1 **t** 60.0

2) Round off each of the following numbers to four significant figures.

a 6.16782 **b** 213.25 **c** 1200.43 **d** 3135.69

e 6.19648 **f** 14.163000 **g** 3024000 **h** 3.14145×10^4

3) Determine the value of each of the following expressions, with the correct number of significant figures.

a $\frac{1.86}{3.14}$

b $(6.6262 \times 10^{-27})(2567)$

c (37.2)(1.5)

d (200)(87.45)

e $\frac{(998)(32.157)}{36}$

f $\frac{4.51545}{0.15}$

g 104 + 37.2 – 18.57

h 87.6 – 0.0005

i 6.23 + 915 – 1012.7

j 4.30 + 291 + 100.3452

k 204.5 – 96.5 – 32.1

l $6.47 \times 10^2 + 4.2 \times 10^1 + 6.8$

m (94.3)(12) – 7.62 + 300.0

n $(5.19 \times 10^{-2} + 1.83)(2.19 \times 10^2)$

o $\frac{(3.18)(2.4)}{1.92} - 0.017$

4) Express each number in scientific notation:

a 0.00374 **b** 1200 **c** 4063.89 **d** 175.1×10^3

e 6460.40×10^7 **f** 0.06627×10^{-25} **g** 9475×10^{-6} **h** $0.003\,74 \times 10^7$

i $0.000\,000\,142 \times 10^1$ **j** 17645 **k** 212,000,000 **l** 0.000 000 831 4

5) Perform the following conversions of units:

a. 7.3 ft = _____in. **b** 6.40 qt = _____ mL **c** 12750 yd = _____ mi

d. 16.54 cm = _____ mm **e** 0.0374 m = _____ μm **f** 146 cm^3 = _____ L

g. 7.30 ft = = _____ m **h** 22.4 L = _____ gal **i** 5.15 ft = _____ cm

j 100 yd^3 = _____ m^3 **k** 1.00 ft^3 = _____ in^3 **l** 250 in^3 = _____ L

6) Perform the following conversion

a 5.00 cm^3 water = ? g; d water = 1.00 g/mL

b 250 cm^3 ethanol = ? g; d ethanol = 0.789 g/mL

c 4.00 lb salt = ? cm^3; d salt = 2.17

d 1.00 lb Au = ? cm^3; d Au = 19.3 g/mL

e 1.00 qt water = ? lb

f 5.00 lb Au = ? in^3

7) Solve the following equations for the indicated variable

a $PV = nRT$; solve for R

b $13.6\ h = 1.15\ H$; solve for h

c $V = (4/3)\pi r^3$; solve for r

d $\lambda = h/m$; solve for

e $69.72 = 68.95\ x + 70.99(1-x)$; solve for x

f $14 = \frac{x}{(1-x)}$; solve for x

8) Answer the following problems based on percent composition

a A copper penny has a mass of 3.015 g and contains 95.0% Cu. What is the mass of copper present?

b An automobile weighs 1.00 ton (short) and contains 13 % Al and 75% Fe. What is the mass of Al present?

c Air contains 78% N_2 and 21 % O_2. A house 40.0 ft X 30.0 ft X 14.0 ft contains how many liters of nitrogen? How many liters of air must one have in order to have 680 L of oxygen?

d A solution of 36.00 % sulfuric acid in water has a density of 1.271 g/mL. How many grams of sulfuric acid (not sulfuric acid solution) are needed to make 5.00 L of this solution?

e The compound silver nitrate ($AgNO_3$) contains 63.5% Ag. If Ag costs $12.00/oz, what is the value of the silver in 125 g of sliver nitrate? What mass of silver nitrate in grams contains a dollars worth of Ag?

Answer Key: Chapter 1

Identify the number of significant figures in each of the following numbers

a 4	**b** 4	**c** 6	**d** 5	**e** 6
f 3	**g** 3	**h** 8	**i** 2	**j** 3
k 4	**l** 4	**m** 6	**n** 1	**o** 1
p 4	**q** 8	**r** 4	**s** 4	**t** 3

1) Round off each of the following numbers to four significant figures.

a 6.168	**b** 213.3	**c** 1200.	**d** 3136
e 6.196	**f** 14.16	**g** 3.024×10^6	**h** 3.141×10^4

2) Determine the value of each of the following expressions, with the correct number of significant figures.

a 0.592	**b** 1.701×10^{-23}	**c** 56
d 2×10^4	**e** 8.9×10^2	**f** 30.
g 123	**h** 87.6	**i** –91
j 396	**k** 75.9	**l** 6.96×10^2
m 1.4×10^3	**n** 4.12×10^2	**o** 4.0

3) Express each number in scientific notation:

a 3.74×10^{-3}	**b** 1.2×10^{3}	**c** 4.06389×10^{3}	**d** 1.751×10^{5}
e 6.46040×10^{10}	**f** 6.627×10^{-27}	**g** 9.475×10^{-3}	**h** 3.74×10^{4}
i 1.42×10^{-6}	**j** 1.7645×10^{4}	**k** 2.12×10^{8}	**l** $8.31\ 4 \times 10^{-7}$

4) Perform the following conversions of units:

a 88 in.	**b** 6.04 $\times 10^{3}$ mL	**c** 7.244 mi
d 165.4 mm	**e** 37400 μm	**f** 0.146 L
g 2.22 m	**h** 5.94 gal	**i** 157 cm
j 8 $\times 10^{1}$ m^5	**k** 1.73 $\times 10^{3}$ in^3	**l** 4.1 L

5) Perform the following conversions

a 5.00 g	**b** 2.0×10^{2} g	**c** 836 cm^3
d = 23.5 cm^3	**e** 2.08 lb	**f** 7.17 in^3

6) Solve the following equations for the indicated variable

a $R = \frac{PV}{nT}$	**b** $h = \frac{1.15\ H}{13.6}$	**c** $V = (4/3)\pi r^3$; solve for r $r = \sqrt[3]{\frac{V3}{\pi 4}}$
d	**e** x = 0.62	**f** x = 0.93

7) Answer the following problems based on percent composition

a $3.015\text{ g} \times \frac{95.0\text{ g Cu}}{100\text{ g pennies}} = 2.86\text{ g Cu}$

b $1.00\text{ ton} \times \frac{2000\text{ lb}}{1\text{ ton}} \times \frac{453.6\text{g}}{1\text{ lb}} \times \frac{13\text{ g Al}}{100\text{g car}} = 1.18 \times 10^{5}\text{ Al}$

c Vol. of house = 40.0 ft X 30.0 ft X14.0 ft = 1.68×10^{4} ft^3 air =

$680\text{ L} \times \frac{100\text{ L air}}{21\text{ L } O_2} = 3.2 \times 10^{4}\text{ L air}$

d $5.00\text{L sol} \times \frac{1000\text{ mL}}{1\text{L}} \times \frac{1.271\text{ g sol}}{1\text{ mL sol}} \times \frac{36.00\text{ g } H_2SO_4}{100\text{ g sol}} = 2.29 \quad 10^{3}$

e $125\text{ g Ag} \times \frac{63.5\text{ g Ag}}{100\text{ g } AgNO_3} \times \frac{1\text{ lb}}{453.6\text{ g}} \times \frac{16\text{ oz}}{1\text{ lb}} \times \frac{\$12.00}{1\text{ oz}} = \$34.5$

$\$1.00\text{ Ag} \times \frac{1\text{ oz}}{\$12.00} \times \frac{1\text{ lb}}{16\text{ oz}} \times \frac{453.6\text{g}}{1\text{ lb}} \times \frac{100\text{g } AgNO_3}{63.5\text{ g Ag}} = 3.72\text{ g } AgNO_3$